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Approved
23 April 1964
TDC Meeting

Research and Development
Project Approval Request

I. Identification

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This program covers the bailment of an [redacted] Processing Unit and a Laminating Unit with all necessary appurtenances, materials, dyes, personnel training and consulting services for a one-year period. The project will come under the Technical Development Program of the P&DS, NPIC, at a total estimated cost of [redacted] The item was included in the NPIC financial plan for Fiscal Year 1964 at the [redacted] level under the category "Special Techniques and Development Studies". This project constitutes the third part of a three-part effort toward development of improved, unconventional photographic systems to supplement conventional silver-halide systems.

II. Objectives

The objective of this program will be to provide NPIC with a working experimental model of a new, extremely rapid, versatile and automatic full-color printer-processor for purposes of in-house familiarization and experimentation in color reproduction and potential uses. The device will provide a test vehicle to aid in the establishment of design parameters for NPIC color-duplicating systems of the future.

III. Background

It has long been recognized that for exploitation color photography can provide a valuable supplement to black and white photography. Nevertheless, the use of color concepts and systems for analysis and interpretation has lagged for many important reasons; some of which are:

(1) In the past color acquisition systems have been prohibitively poor in color fidelity and resolution.

(2) The effects of atmospheric haze has presented an almost insurmountable problem, particularly in the blue record.

(3) Little has been known about the color balance or imbalance best suited to interpretation problems.

(4) All color duplicating systems have lacked sufficient image quality and resolution.

(5) Access time has been prohibitive because of the complex processing procedures.

Declass Review by NIMA / DoD

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Many research and development efforts are underway to evolve solutions to the many problems involving the use of color in both intelligence collection and exploitation of photographs. The [redacted] is currently conducting studies of potential systems for acquisition and for duplication. The Air Force is engaged in several programs to determine the best means of acquisition; whether full color is more useful than two-color systems; and what materials should be employed. Several private interests are exploring means for achieving greater information readability by multi-zone spectral acquisition and spectrazonal analysis of black and white images, followed by later synthesis in widely separated colors.

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The above efforts have led to the conclusion that significant gains can be achieved through the use of color as a supplement to black and white photography for both acquisition and exploitation. At the same time these efforts have revealed vast areas of the subject about which little is known.

Perhaps the most significant work so far has been that performed by the Reconnaissance Branch at the Wright Patterson Air Force Base. As a result of their recent work it was dramatically shown that quite useful originals could be acquired on high-resolution black and white film as black and white separations in the respective "green" and "red" regions of the spectrum with total exclusion of the "blue" region. The black and white images when used in conjunction with two-color prints, printed from separations in divergent colors, yielded images of highly improved readability.

The Air Force work shows that a way has been found to provide color acquisition in black and white and at the same time of high resolution. The demonstration of its feasibility and value now justifies vigorous pursuit of a high-quality system for reconstituting the color images from black and white separations. The proposed [redacted] system with some modification may prove to be ideal for such a purpose.

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[redacted] Printer-Processor is a single, automatic unit designed to expose, fully process and dry a full-color print in approximately three (3) minutes. The system is classed as an electroplating process that plates out dyes complementary to the exposure color, for each of three color separations. The proposed unit is color-balanced for color negatives but could be readily adapted or color balanced to exposures from black and white color separations. Also, the system could very readily be made to print out only two colors. Color balance can be changed at will.

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Another adaptation of this system may well provide a black and white enlarging system capable of producing a dry enlarged print in less than two minutes. This exceeds the capability of any other system known to the NPIC Staff for providing black and white enlargements and would satisfy an existing problem at NPIC.

The points described above present only a few of the many diversifications possible with the proposed Electrocolor printer-processor.

25X1A It is proposed that the [redacted] printer-processor be located in an experimental space (other than the Production Services Division) for extensive testing and experimentation for a one-year period and that a competent operator be trained specifically to carry out the program on a full-time basis. Upon completion of this contract, it is anticipated that PDS and PSD would 25X1A have the knowledge necessary to establish design objectives for one or more operational units based on the principles of [redacted] reproduction concept.

25X1A [redacted] has volunteered to cooperate in every way possible to assure maximum benefit from the system and to incorporate any new improvements in the machine as they become available.

IV. Technical Specifications

No specifications were imposed directly upon the proposed contractor. 25X1A A brief description of the [redacted] Processor follows:

25X1A [redacted] Processor [redacted]
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25X1A 1. The [redacted] processor is a utilized machine which incorporates the necessary components to produce full color $8\frac{1}{2}$" x 11" projection prints from 2 1/4" x 2 1/4" through 4 x 5 inch color negatives.

There are six timing controls -- three for exposure and three for plating. These are located along the side of the machine for easy access and are quality timers designed for accurate repeatability. Each timer is individually set for the desired exposure for each color and the desired plating time for each dye bath. The overall exposure level or the overall dye plating time may be varied by a percentage compensation dial. The electrical system carries its own voltage stabilization to deliver a constant electrical supply to the light source.

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2. Other controls which are incorporated to adjust to various operating conditions are generally set during installation and will need no further adjustment. These include the following:

a. Wash water timer.
b. Air knife timer
c. Hydraulic elevator speed for dye tanks.
d. Hydraulic indexing speed for water knife.
e. Hydraulic air knife vertical travel speed.
f. Exposure lamp voltage.

The wash water temperature as well as the platen circulating water system temperature are controlled by Powers Regulator valves. They must be checked periodically to maintain water temperature.

V. Contractor and Financial Arrangements

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The contract will be placed with the [redacted] on the basis of their proposal at an estimated cost of [redacted]

The contract will consist of a bailment agreement to cover the printer-processor and the laminating unit. The quoted price will include all materials and dyes, as well as installation, adjustment and alignment, instruction of an operator and services of a consultant as required.

VI. Coordination

The proprietary nature of this system has limited the coordination for this project. The Vendor has strongly advised NPIC personnel against premature release of technical knowledge to people likely to inform competitive companies

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[redacted] accomplishments. However, staff investigation throughout DOD components and industry reveal that this program does not duplicate any other development effort capable of meeting NPIC's requirements.

VII. Security

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